

Warm-up!

1. Find the midpoint between A(3,-2) and B(5,4).

2. Find the length of \overline{AB} .



$M(4,1)$

$$d = \sqrt{2^2 + 6^2} = \sqrt{40} = 2\sqrt{10}$$

$$33. \left(\frac{2\sqrt{3}}{3}, \frac{\sqrt{5}}{4} \right) \left(-\frac{2\sqrt{3}}{3}, \frac{\sqrt{5}}{2} \right)$$

$$d = \sqrt{\left(\frac{2\sqrt{3}}{3} - \left(-\frac{2\sqrt{3}}{3}\right) \right)^2 + \left(\frac{\sqrt{5}}{4} - \frac{\sqrt{5}}{2} \right)^2}$$

$$= \sqrt{\left(\frac{4\sqrt{3}}{3} \right)^2 + \left(-\frac{\sqrt{5}}{4} \right)^2}$$

$$= \sqrt{\frac{16 \cdot 3}{9} + \frac{5}{16}}$$

$$= \sqrt{\frac{256 + 15}{98}} = \sqrt{\frac{271}{98}} = \frac{\sqrt{271}}{4\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{813}}{12}$$

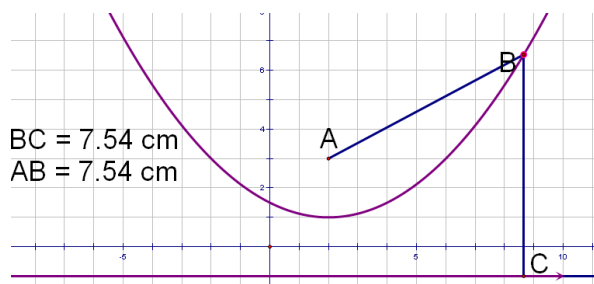
8-2 Parabolas

Conic Sections--figure that can be obtained by slicing a double cone

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Parabola--set of all points in a plane that are the same distance from a given point (focus) and a given line (directrix)



Equation of a Parabola

$$y = a(x - h)^2 + k$$

$V(h, k)$

+a opens up

-a opens down

axis $x = h$

Distance between vertex and focus
Distance between vertex and directrix

$$\left| \frac{1}{4a} \right|$$

Latus rectum--The segment that goes through the focus and is perpendicular to the axis of symmetry

$$\text{Length} = \left| \frac{1}{a} \right|$$

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Example 1:

$$y = \frac{1}{16}(x-2)^2 + 3$$

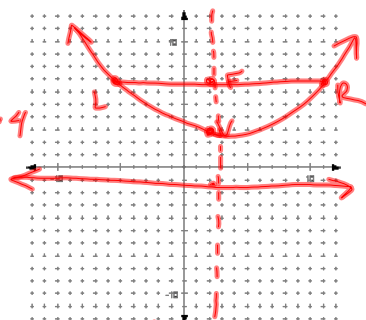
$$\left| \frac{1}{4(\frac{1}{16})} \right| = \left| \frac{1}{\frac{1}{4}} \right| = 4$$

$$V(2, 3)$$

$$F(2, 7)$$

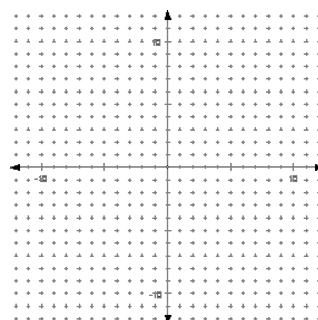
$$D: y = -1 \quad \text{Latus Rectum: } \left| \frac{1}{4a} \right| = 4$$

$$a.o.s. x = 2 \quad L(-6, 7) \quad R(14, 7)$$



Example 2:

$$4(y+9) = (x+6)^2$$



Equation of a Parabola

$$x = a(y - k)^2 + h$$

$$V(h, k)$$

+a opens right

-a opens left

$$a.o.s. y = k$$

Distance between vertex and focus

Distance between vertex and directrix

$$\left| \frac{1}{4a} \right|$$

Latus rectum--The segment that goes through the focus and is perpendicular to the axis of symmetry

$$\text{Length} = \left| \frac{1}{a} \right|$$

Example 2:

$$x = -\frac{1}{12}(y-5)^2 - 2$$

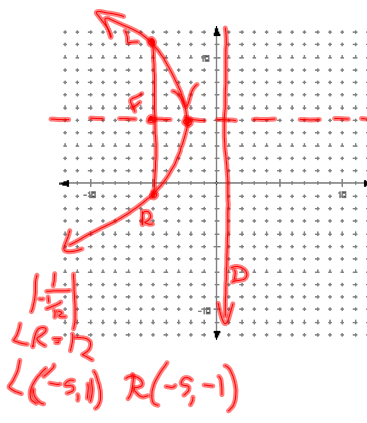
$$V(-2, 5)$$

$$\left| \frac{1}{4(\frac{1}{12})} \right| = 3$$

$$F(-5, 5)$$

$$D: x = 1$$

$$a.o.s. y = 5$$



HW

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Attachments

parabola_sketch.gsp